# Fully Actuated System Approach and Nonholonomic Systems

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## Abstract

Inspired by the practical mechanical fully actuated systems, the fully actuated system (FAS) approach has been recently proposed for general dynamical control system designs. The approach is parallel to the well-known state-space one, and has found its great power in dealing with control of complicated nonlinear dynamical systems, including the time-varying nonlinear systems with time-varying delays. In this talk, the background and the development of the FAS approach are briefly outlined, and then applications of the FAS approach to a type of nonholonomic systems, motivated by the basic Brockett's two example systems both with the backgrounds of moving object control, are discussed. New point views and concepts are presented from the FAS approach angle.

## About the speaker

**Guangren Duan** received his Ph.D. degree in Control Systems Sciences from Harbin Institute of Technology, Harbin, P. R. China, in 1989. After a two-year post-doctoral experience at the same university, he became professor of control systems theory at that university in 1991. He is the founder and the Honorary Director of the Center for Control Theory and Guidance Technology at Harbin Institute of Technology, and recently he is also in charge of the Center for Control Science and Technology at the Southern University of Science and Technology. He visited the University of Hull, the University of Sheffield, and also the Queen's University of Belfast, UK, from December 1996 to October 2002, and has served as Member of the Science and Technology Committee of the Chinese Ministry of Education, Vice President of the Control Theory and Applications Committee, Chinese Association of Automation (CAA), and Associate Editors of a few international journals. He is currently an Academician of the Chinese Academy of Sciences, and Fellow of CAA, IEEE and IET. His main research interests include parametric control systems design, nonlinear systems, descriptor systems, spacecraft control and magnetic bearing control. He is the author and co-author of 5 books and over 380 SCI indexed publications.